Grade 10 Applied Chemistry Review

## Chemical Reactions

**Chemical reaction**- a change in matter that produces new substances with new properties

* Reactants: substances that **react** together in a chemical reaction
* Products: new substances **produced** (made) in a chemical reaction

REACTANTS 🡪 PRODUCTS

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**WHMIS**: Workplace Hazardous Materials Information System

**HHMS**: Hazardous Household Product Symbols

Common symbols and their explanations:

[INSERT WHMIS PICTURE FIGURE]

#### Chemical Formulas

* Short form for a chemical compound
* Made up of letters and subscript numbers
  + Letters: the chemical symbols; tell which elements are in the compound
  + Subscript Numbers: tell how many atoms of the these elements are in the compound

Example: H2O

* H and O represent the elements Hydrogen and Oxygen
* 2 represents that there are two hydrogen atoms

#### Compounds

Compounds are a combination of two or more elements. They can be divided into two categories: ionic and molecular.

**Ionic Compounds**:

* Form when metal (negatively charged) atoms bond with non-metal (positively charged) atoms. This bond occurs because the negatively and positively charged atoms are attracted to each other.
* They share the following common properties:
  + They are solid at room temperature
  + They have a high melting point
  + They conduct electricity when they are melted or dissolved in water.

**Molecular Compounds**:

* Non-metal atoms share electrons with other non-metal atoms including hydrogen
* They share the following properties:
  + They may be solids, liquids, or gases at room temperature
  + They have lower melting points than ionic compounds
  + They do not conduct electric current when they are melted or dissolved in water, except in the case of certain acids.

Naming Ionic and Molecular Compounds

|  |  |
| --- | --- |
| **Ionic Compounds** | **Molecular Compounds** |
|  |  |

#### Types of Chemical Reactions

Every type of chemical reaction produces new products that are different from the reactants. There are four common types of chemical reactions: synthesis reactions, decomposition reactions, single displacement reactions, and double displacement reactions.

Reactant 1 + Reactant 2 🡪 Product 3 + Product 4

Basic Form:

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| **Type of Reaction** | **Representation of the Reaction** |
| **Synthesis Reaction**   * Two or more reactants combine to produce a new product | A + B 🡪 AB |
| **Decomposition Reaction**   * One compound breaks down into two or more simpler compounds or elements | AB 🡪 A + B |
| **Single Displacement**   * One element takes the place of another element in a compound | A + BC 🡪 AC + B |
| **Double Displacement**   * The metal ions of two different compounds exchange places | AB + CD 🡪 AD + BC |

#### Chemical Equations

* Three types of equations: word, chemical, and balanced equations

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| **Types of Equations** | **Example** |
| **Word equation**   * Reactants and products written out in words | Hydrogen + Oxygen 🡪 Water |
| **Chemical equation**   * Reactants and products are written in their chemical compounds | H2 + O2 🡪 H2O |
| **Balanced Chemical equation**   * Reactants and products are written in their chemical compounds and have the correct number of atoms of each element | 2H2 + O2 🡪 2 H2O |

#### Law of Conservation of Mass

During a chemical reaction, the total mass and number of atoms of the reactants equal the total mass and number of atoms of the products.

## Acids and Bases

Acids and bases are common substances that you come in to contact with every day.

**Acid-** a compound that tastes sour, corrodes metals and tissue, and turns blue litmus paper red

**Base**- a compound that tastes bitter, has a slippery texture corrodes tissue, and turns red litmus paper blue

#### pH Scale and Indicators

The pH scale is a scale from 0 to 14 that describes how acidic or basic a substance is

[INSERT PICTURE OF PH SCALE]

**Acid/Base Indicator**- a substance that changes colour when added to an acid or base

#### Neutralization Reactions

A neutralization reaction is a reaction between an acid and a base that “neutralizes” their acidic and basic properties.

Acid + Base 🡪 Salt + Water

HCl + NaOH 🡪 NaCl +H2O

General form:

Example: